Abstract of the Disclosure

DESENSITIZING ARMATURE AIR GAP TO COMPONENT DISTORTION IN A FUEL INJECTOR

Because of the relatively high pressures experienced within fuel injectors, several internal components can undergo substantial deformation each time fuel is pressurized to injection levels. In some instances, such as when a solenoid operated control valve is positioned near a distortion region, the internal distortion can cause a fuel injector to behave with less predictability, and can undermine consistency from one fuel injector to another, since distortion levels and affects therefrom are likely to vary substantially from one injector to another. In order to desensitize fuel injector performance to this internal distortion, a deflection cavity is disposed within the fuel injector between the distortion region and the needle valve of the fuel injector. This strategy finds particular applicability to needle control valves disposed deep within fuel injectors in order to control fluid pressure on a closing hydraulic surface of a direct control needle valve, which opens and closes the nozzle outlets.